

WHAT IS CLAIMED IS:

- 1 1. A coupling device comprising:
2 a coupling device body, having
3 a first receptacle operable for coupling with a first syringe having a first
4 volumetric size;
5 a second receptacle operable for coupling with a second syringe having a
6 second volumetric size;
7 a channel disposed between said first receptacle and said second receptacle so
8 as to allow fluid to flow from said first receptacle to said second receptacle;
9 wherein said first volumetric size is different from said second volumetric
10 size.
- 1 2. The coupling device as described in claim 1 wherein said first
2 receptacle is sized to accept a first barrel size and wherein said second receptacle is sized to
3 accept a second barrel size different from said first barrel size.
- 1 3. The coupling device as described in claim 1 wherein said channel is
2 configured so as to be substantially cylindrical with a diameter in the range of about 0.4
3 millimeters to about 0.6 millimeters.
- 1 4. The coupling device as described in claim 1 wherein said first
2 receptacle is operable for coupling with a 250 microliter syringe.
- 1 5. The coupling device as described in claim 1 wherein said second
2 receptacle is operable for coupling with a 10 microliter syringe.
- 1 6. The coupling device as described in claim 1 wherein said first
2 receptacle is operable for coupling with a 250 microliter syringe and wherein said second
3 receptacle is operable for coupling with a 10 microliter syringe.
- 1 7. The coupling device as described in claim 1 wherein said channel is
2 operable for transferring a viscous material from said first syringe to said second syringe.

1 8. The coupling device as described in claim 1 wherein said coupling
2 device body is comprised of a non-metallic material.

1 9. The coupling device as described in claim 9 wherein said non-metallic
2 material comprises PEEK.

1 10. The coupling device as described in claim 1 and further comprising:
2 a first ferrule for use in coupling said first syringe with said coupling device.

1 11. The coupling device as described in claim 1 and further comprising:
2 a second ferrule for use in coupling said second syringe with said coupling
3 device.

1 12. A method of coupling a first syringe and a second syringe, said method
2 comprising:

3 providing a coupling device body having a first receptacle and a second
4 receptacle and a channel disposed between the first receptacle and the second receptacle;

5 coupling a first syringe to the first receptacle and a second syringe to the
6 second receptacle, with the first syringe having a volumetric size that is different from a
7 volumetric size of the second syringe.

1 13. The method as described in claim 12 wherein said first receptacle is
2 sized to accept a first barrel size and wherein said second receptacle is sized to accept a
3 second barrel size different from said first barrel size.

1 14. The method as described in claim 12 wherein said channel comprises a
2 substantially cylindrical shape with a diameter in the range of about 0.4 millimeters to about
3 0.6 millimeters.

1 15. The method as described in claim 12 and further comprising:
2 disposing a needle in said channel.

1 16. The method as described in claim 12 wherein said coupling said first
2 syringe to said first receptacle comprises:

3 coupling a 250 microliter syringe to said first receptacle.

1 17. The method as described in claim 12 wherein said coupling said
2 second syringe to said second receptacle comprises:

3 coupling a 10 microliter syringe to said second receptacle.

1 18. The method as described in claim 12 and further comprising:
2 transferring viscous material from said first syringe to said second syringe.

1 19. The method as described in claim 18, wherein the viscous material has
2 a viscosity in the range from about 100,000 centipoise to about 300,000 centipoise.

1 20. The method as described in claim 12 and further comprising:
2 utilizing a non-metallic material as said coupling device body.

1 21. The method as described in claim 20 and further comprising: utilizing
2 PEEK as said non-metallic material.

1 22. The method as described in claim 12 and further comprising:
2 disposing a first ferrule in said first receptacle, said first ferrule configured for
3 coupling said first syringe with said first receptacle.

1 23. The method as described in claim 12 and further comprising:
2 disposing a second ferrule in said second receptacle, said second ferrule
3 configured for coupling said second syringe with said second receptacle.

1 24. The method as described in claim 12 and further comprising:
2 disposing a first ferrule in said first receptacle, said first ferrule configured for
3 coupling said first syringe with said first receptacle;

4 disposing a second ferrule in said second receptacle, said second ferrule
5 configured for coupling said second syringe with said second receptacle.

1 25. A method of mixing a LCP comprising:
2 providing a first syringe having a syringe barrel;
3 depositing a lipid material in said syringe barrel;
4 adding protein material to said syringe barrel;
5 mixing said lipid material and said protein material in said syringe barrel to
6 form said LCP in said syringe barrel.

1 26. The method as described in claim 25 and further comprising:
2 utilizing a second syringe to add said protein material to said first syringe
3 barrel.

1 27. The method as described in claim 25 and further comprising:
2 transferring said protein material and said lipid material to said second
3 syringe.

1 28. The method as described in claim 25 and further comprising:
2 dispensing said LCP material in a plurality of holding locations.

1 29. The method as described in claim 25 and wherein the holding locations
2 comprise an array of wells in a well plate.

1 30. The method as described in claim 25 and further comprising:
2 dispensing said LCP material on a microwell array.

1 31. The method as described in claim 25 and further comprising:
2 dispensing said LCP material in a container;
3 adding crystallization promoting material to said container;

4 growing a protein crystal from said LCP material and said crystallization
5 promoting material in said container.

1 32. The method as described in claim 31 and further comprising:
2 drying said crystallization promoting material prior to said dispensing said
3 LCP material in said container.

1 33. A method of transferring viscous material, said method comprising:
2 providing a first syringe barrel containing a volume of viscous material, said
3 first syringe barrel having a first volumetric size;
4 providing a coupling device;
5 coupling said first syringe barrel with said coupling device;
6 providing a second syringe barrel, said second syringe barrel having a second
7 volumetric size different from said first volumetric size of said first syringe barrel;
8 coupling said second syringe barrel with said coupling device;
9 transferring at least a portion of said volume of viscous material from said first
10 syringe barrel to said second syringe barrel through said coupling device.

1 34. The method as described in claim 33 and further comprising:
2 transferring said viscous material through a channel of said coupling device.

1 35. The method as described in claim 34 and further comprising:
2 transferring said viscous material through a needle disposed in said channel.

1 36. The method as described in claim 35 and further comprising:
2 utilizing a needle having a length less than about 20 millimeters.

1 37. The method as described in claim 36 and further comprising:
2 utilizing a needle having an outside diameter of approximately 0.65
3 millimeters.

1 38. The method as in claim 33, wherein the viscous material has a
2 viscosity in the range from about 100,000 centipoise to about 300,000 centipoise.

1 39. The method as in claim 33, wherein the viscous material comprises
2 lipidic mesophase material.

1 40. An apparatus for dispensing viscous material, said apparatus
2 comprising:

3 a syringe barrel;

4 a syringe plunger disposed in said syringe barrel;

5 a needle having a length of less than about 20 millimeters and an outside
6 diameter in the range of about 0.4 millimeters to about 0.72 millimeters;

7 a ferrule operable for coupling said needle with said syringe barrel during use.

1 41. The apparatus as described in claim 40 wherein said viscous material
2 comprises lipidic mesophase.

1 42. The apparatus as described in claim 40 wherein said syringe barrel is
2 configured so as not to break when said viscous material is ejected from said needle.

1 43. A LCP mixing kit comprising:

2 a coupling device for coupling a plurality of syringes in fluid communication,
3 said coupling device having a first receptacle and a second receptacle, wherein said first
4 receptacle has a different coupling size from said second receptacle;

5 a first syringe operable for coupling with said coupling device; and

6 a second syringe operable for coupling with said coupling device.

1 44. The LCP mixing kit as described in claim 43 and further comprising:

2 a third syringe having a volume smaller than said first syringe.

1 45. The LCP mixing kit as described in claim 44 and further comprising:

2 a second coupling operable for coupling said first syringe with said second
3 syringe.

1 46. The LCP mixing kit as described in claim 43 and further comprising:
2 a repeating dispenser for repetitively measuring a predetermined quantity of
3 LCP.

1 47. The LCP mixing kit as described in claim 43 and further comprising a
2 well plate.

1 48. The LCP mixing kit as described in claim 43 and further comprising
2 lipid material.

1 49. The LCP mixing kit as described in claim 43 and further comprising a
2 buffer solution.

1 50. A method of dispensing a substance comprising LCP, said method
2 comprising:

3 mixing said substance in a first syringe;

4 transferring said substance from said first syringe to a second syringe, said
5 second syringe having a volume size smaller than the volume size of said first syringe;

6 utilizing said second syringe to dispense said LCP.

1 51. The method as described in claim 50 and further comprising:
2 dispensing said LCP in a container.

1 52. The method as described in claim 50 and further comprising:
2 dispensing said LCP in a well of a well plate.

1 53. The method as described in claim 50 and further comprising:
2 dispensing said LCP on a microarray.

1 54. The method as described in claim 50 and further comprising:

2 dispensing said LCP in a solution for use in growing a protein crystal.